APPENDIX A

SUBSURFACE SOILS DATA

This appendix presents the results of geotechnical explorations and laboratory testing accomplished on the site by various parties. Results from the following exploration programs are included herein:

- Anchor Environmental, L.L.C., Geotechnical Explorations for Boardwalk Design, 2003.
- GeoEngineers, Geotechnical Exploration for Holly Street Bridge, 2003.
- AESI, Inc., Monitoring Wells for Holly Street Landfill Remediation, 2000.
- BEK Engineering and Environmental, Inc., Monitoring Wells at Maritime Heritage Park, 2000.

Base maps, field exploration logs, and laboratory results for each of these exploration programs are provided in this Appendix, arranged in the same order as the list above.

FIELD AND LABORATORY METHODS
Geotechnical Explorations for Boardwalk Design, Anchor Environmental L.L.C., 2003

Anchor performed a geotechnical subsurface investigation program for design of the boardwalk element of this project. Field explorations consisted of four hollow-stem auger borings, drilled on October 6, 2003. The explorations were completed using a 3-3/8-inch inside diameter hollow-stem auger mounted on a truck-mounted drill rig subcontracted by Anchor. The borings were continuously observed by a field representative from Anchor.

Anchor's field representative prepared logs of each boring and the samples taken. Field descriptions were verified through visual observation and index testing in a geotechnical laboratory. Soil samples were obtained every five feet using a split spoon sampler and following sampling protocol for the Standard Penetration Test (SPT, per ASTM D 1587). The number of hammer blows required to drive the sampler the final 12 inches of an 18-inch sampling length constitutes the Standard Penetration Resistance, or "blow count", which serves as an approximate measure of soil density and consistency.

In some cases, very dense or hard soils precluded the ability to drive the sampler the entire 18 inch interval. In this event, the recorded blow count is number of blows required to drive the sampler until refusal, not including the first six inches of penetration, combined with the number of inches driven after the first six. ("Refusal" is defined by ASTM D 1587 as 50 blows per six inches or less of penetration.) An example record would be 90/9", which indicates 90 blows to advance the sampler 9 inches (not including the first six inches of driving). In cases where the sampler meets refusal before six inches of penetration, the recorded blow count includes the total number of blows and the total number of inches driven.

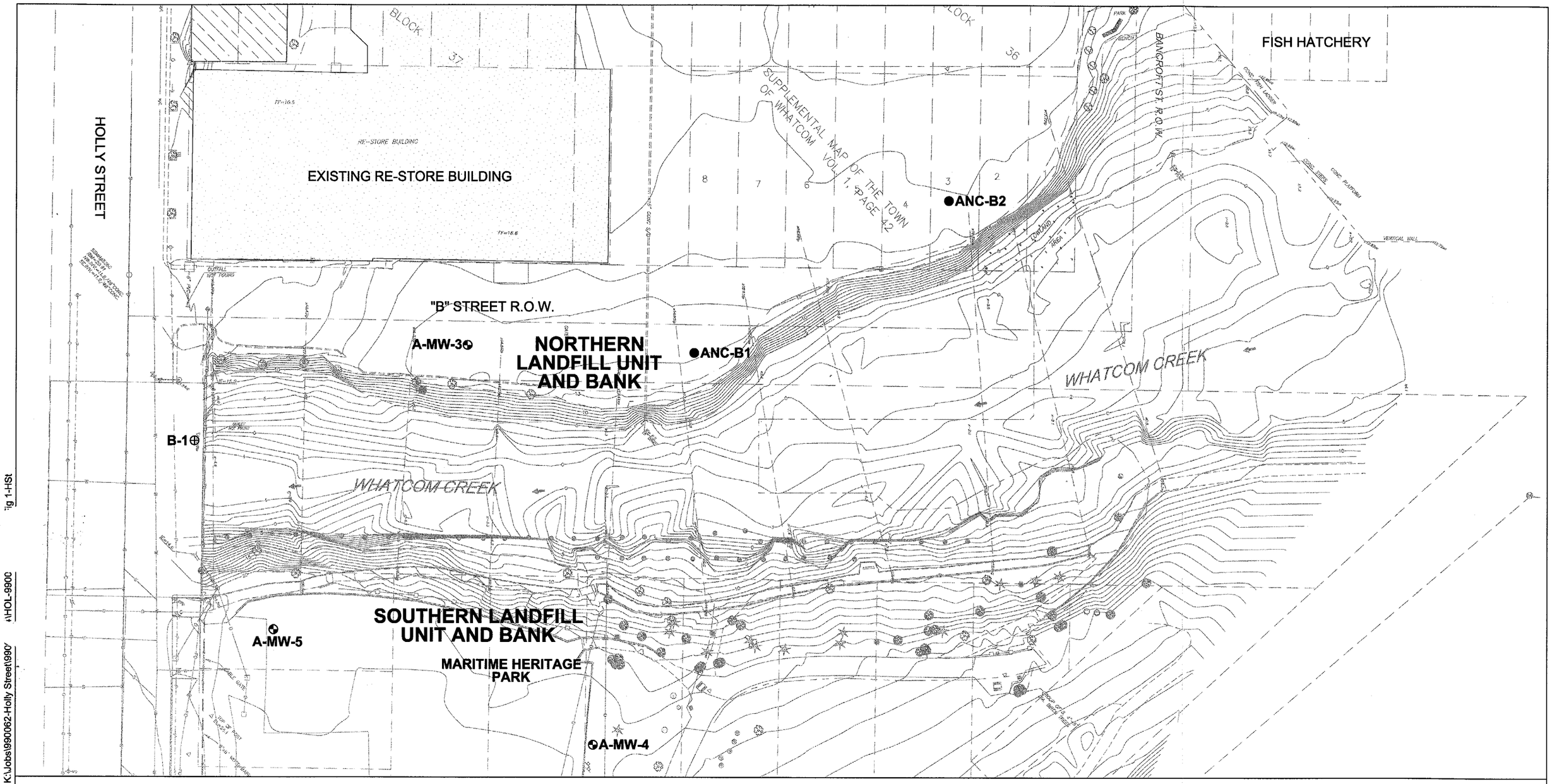
Following Anchor's geotechnical field work, the samples obtained were sent to a geotechnical laboratory subcontracted to Anchor. This appendix includes the results of geotechnical laboratory testing on selected soil samples from our borings. The following is a brief description of the lab tests performed.

Moisture contents were determined for all samples in general accordance with ASTM D2216. The results are plotted at each sample's respective depth on the boring logs in Appendix A.

Grain-size analyses were performed in general accordance with ASTM D422. A hydrometer analysis was performed on the fines fraction (finer than the U.S. No. 200 sieve) for selected samples. The resulting plots of grain-size distribution are presented in this appendix. The results of these tests indicate the samples classify as the following:

Table A1
Soil Sample Classifications

Sample ID	Depth in Feet	Classification
ANC-B1-S6	28	SAND
ANC-B2-S4	18	Slightly gravelly, silty SAND
ANC-B2-S8	38	Silty SAND and GRAVEL



ANC-B1 ● GEOTECH EXPLORATION BORING LOCATION AND NUMBER (THIS INVESTIGATION)

A-MW-3 ⊕ MONITORING WELL LOCATION AND NUMBER (AESI, 2000)

B-1 ⊕ PREVIOUS GEOTECHNICAL EXPLORATION LOCATION AND NUMBER (GEOENGINEERS, 2003)

NOTES:
1. SOURCE OF SURVEY: PACIFIC SURVEY AND ENGINEERING, 1812 CORNWALL, BELLINGHAM, WA, 98225, (360) 671-7387, APRIL 24, 2002.

HORIZONTAL DATUM: CITY OF BELLINGHAM COMPREHENSIVE MAPPING PROGRAM OF 1973

VERTICAL DATUM: NOAA/NOS MLLW TIDAL DATUM

0 50
Scale in Feet

Nov 21, 2003 2:22pm cdavidson K:\Jobs\990062-Holly Street\990 ...HOL-9900 ...ig 1-HSt

ANCHOR ENVIRONMENTAL, L.L.C.

Figure 1
Site and Exploration Plan
Holly Street Landfill Redevelopment

Sample Description

Classification of soils in this report is based on visual field and laboratory observations which include density/consistency, moisture condition, grain size, and plasticity estimates and should not be construed to imply field nor laboratory testing unless presented herein. Visual–manual classification methods of ASTM D 2488 were used as an identification guide.

Soil descriptions consist of the following:
Density/consistency, moisture, color, minor constituents, MAJOR CONSTITUENT, additional remarks.

Density/Consistency

Soil density/consistency in borings is related primarily to the Standard Penetration Resistance.
Soil density/consistency in test pits is estimated based on visual observation and is presented parenthetically on the test pit logs.

SAND or GRAVEL Density	Standard Penetration Resistance (N) in Blows/Foot	SILT or CLAY Consistency	Standard Penetration Resistance (N) in Blows/Foot	Approximate Shear Strength in TSF
Very loose	0 – 4	Very soft	0 – 2	<0.125
Loose	4 – 10	Soft	2 – 4	0.125 – 0.25
Medium dense	10 – 30	Medium stiff	4 – 8	0.25 – 0.5
Dense	30 – 50	Stiff	8 – 15	0.5 – 1.0
Very dense	>50	Very stiff	15 – 30	1.0 – 2.0
		Hard	>30	>2.0

Moisture

Dry	Little perceptible moisture
Damp	Some perceptible moisture, probably below optimum
Moist	Probably near optimum moisture content
Wet	Much perceptible moisture, probably above optimum

Minor Constituents

	Estimated Percentage
Not identified in description	0 – 5
Slightly (clayey, silty, etc.)	5 – 12
Clayey, silty, sandy, gravelly	12 – 30
Very (clayey, silty, etc.)	30 – 50

Legends

Sampling Test Symbols

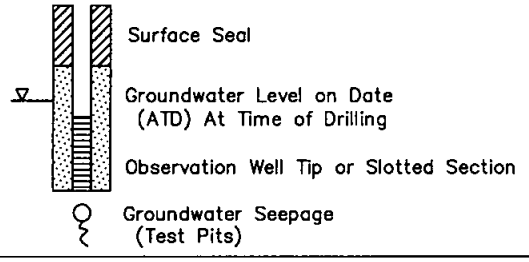
BORING SAMPLES

- Split Spoon
- Shelby Tube
- Cuttings
- Core Run
- * No Sample Recovery
- P Tube Pushed, Not Driven

TEST PIT SAMPLES

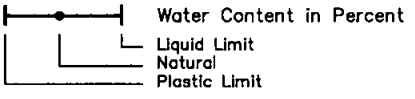
- Grab (Jar)
- Bag
- Shelby Tube

Groundwater Observations



Test Symbols

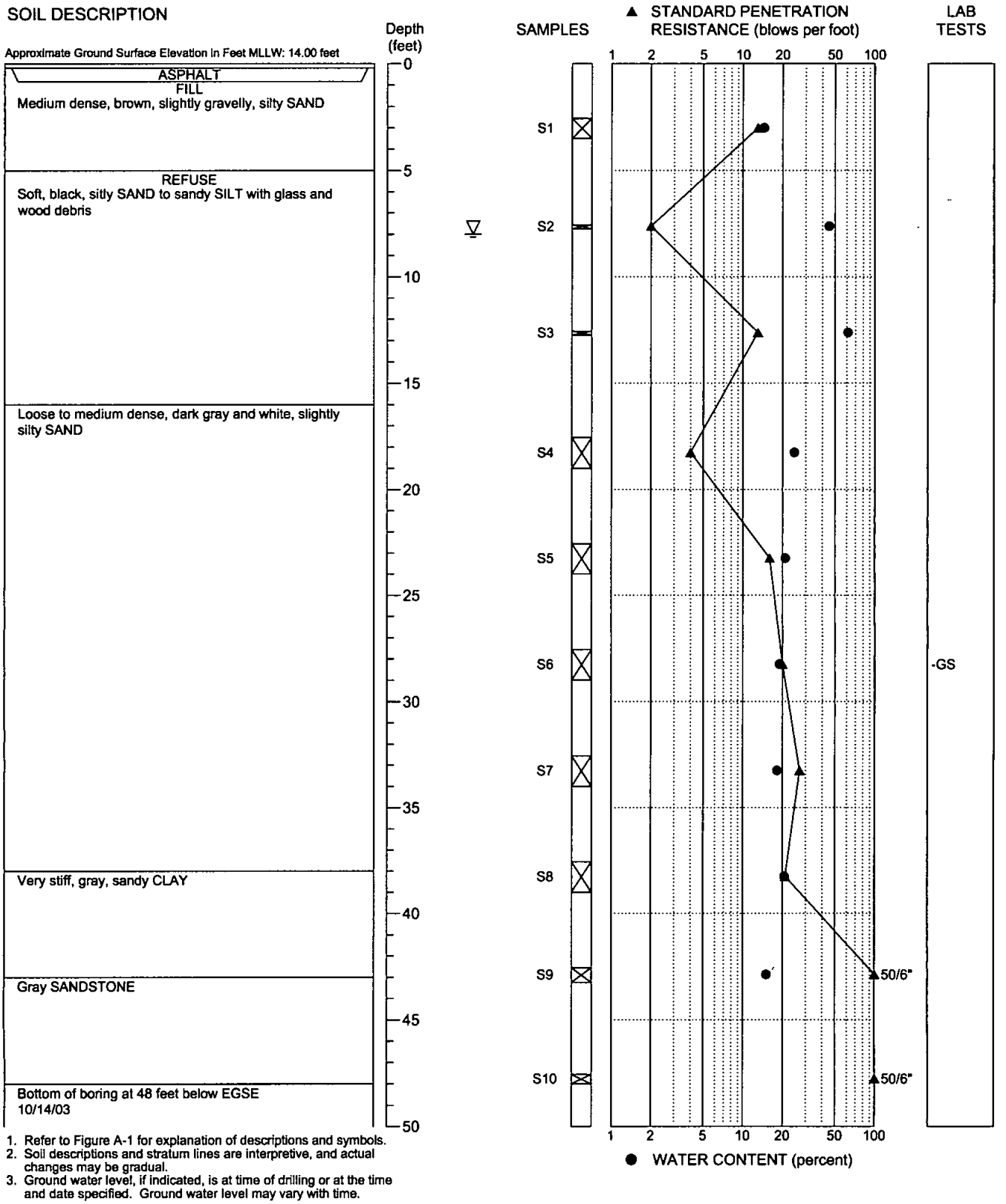
NS	No Sheen
SS	Slight Sheen
MS	Moderate Sheen
HS	Heavy Sheen
TCD	Triaxial Consolidated Drained
QU	Unconfined Compression
DS	Direct Shear
K	Permeability
PP	Pocket Penetrometer Approximate Compressive Strength in TSF
TV	Torvane Approximate Shear Strength in TSF
CBR	California Bearing Ratio
MD	Moisture Density Relationship
AL	Atterberg Limits
PID	Photoionization Detector Reading
CA	Chemical Analysis
DT	*In Situ* Density Test



ANCHOR ENVIRONMENTAL, L.L.C.

Figure A-1
Key to Exploration Logs
Holly Street Landfill Redevelopment

BORING: ANC-B1



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive, and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling or at the time and date specified. Ground water level may vary with time.

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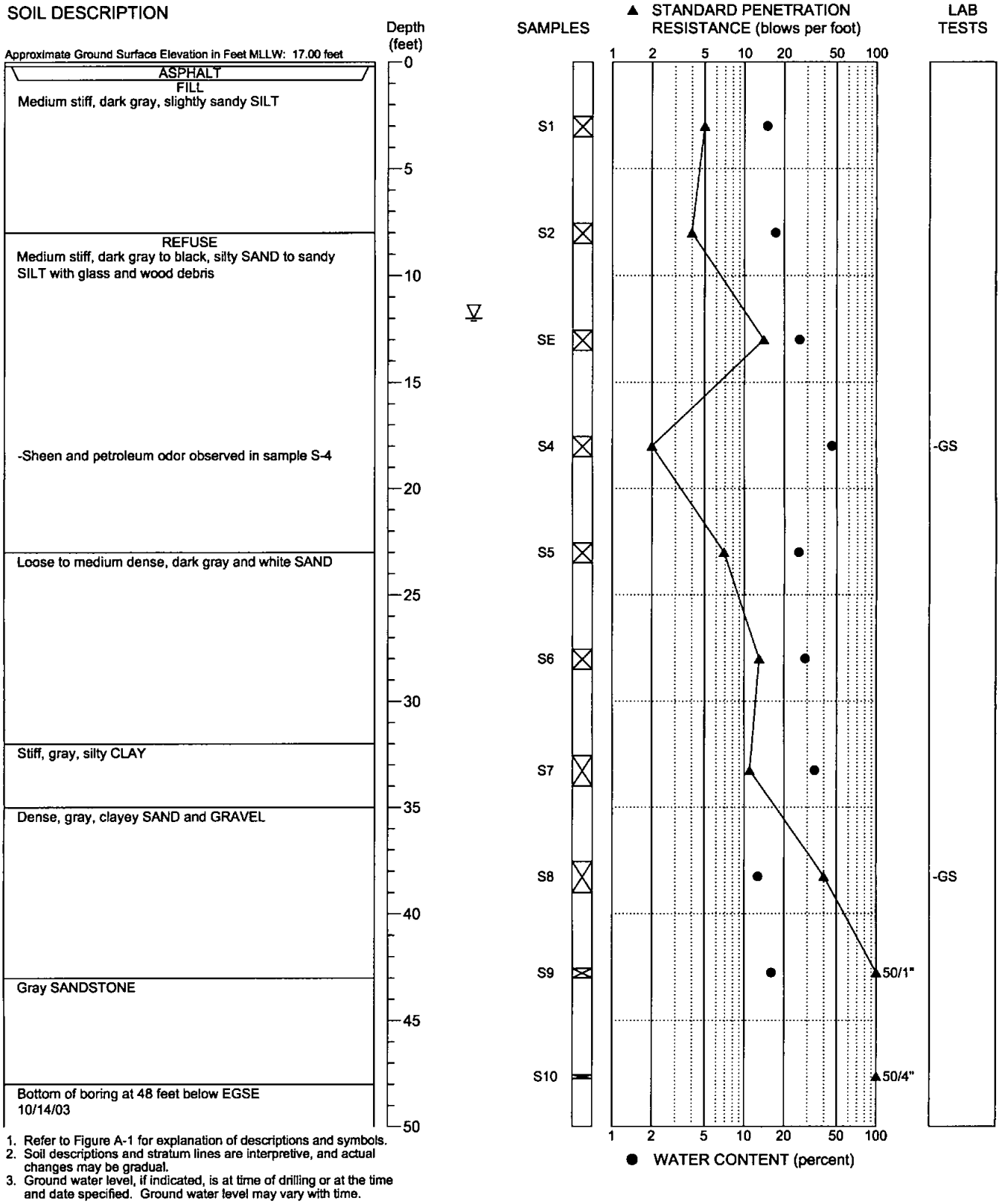
ANCHOR ENVIRONMENTAL, L.L.C.

Figure A-2
Boring ANC-B1
Holly Street Landfill Redevelopment

BORING: ANC-B2

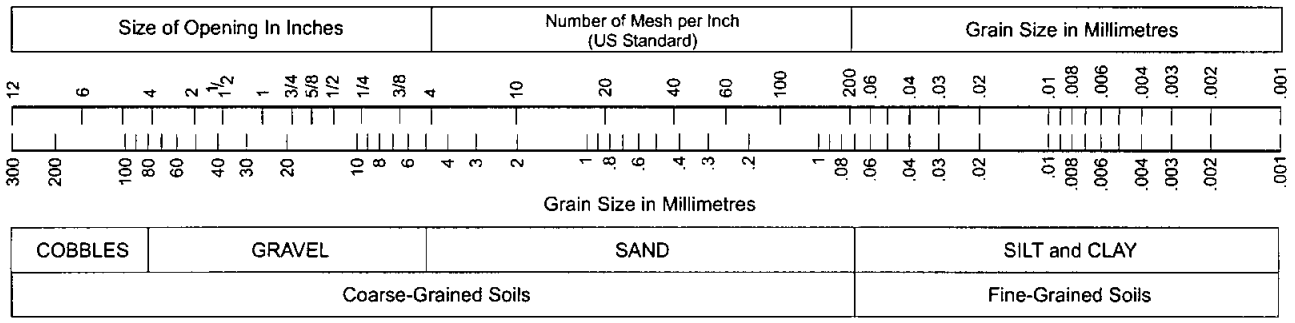


1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive, and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling or at the time and date specified. Ground water level may vary with time.

Nov 21, 2003 2:21pm cdavidson K:\Jobs\990062-Holly Street\990062041HOL-99006204-38.dwg ANC-B2_HST

ANCHOR ENVIRONMENTAL, L.L.C.

Figure A-3
Boring ANC-B2
Holly Street Landfill Redevelopment



Coarse-Grained Soils

G W	G P	G M	G C	S W	S P	S M	S C
Clean GRAVEL <5% fines		GRAVEL with >12% fines		Clean SAND <5% fines		SAND with >12% fines	
GRAVEL >50% coarse fraction larger than No. 4				SAND >50% coarse fraction smaller than No. 4			
Coarse-Grained Soils >50% larger than No. 200 sieve							

G W and S W $\left(\frac{D_{60}}{D_{10}}\right)$ >4 for G W >6 for S W & $1 \leq \left(\frac{(D_{30})^2}{D_{10} \times D_{60}}\right) \leq 3$

G P and S P Clean GRAVEL or SAND not meeting requirements for G W and S W

G M and S M Atterberg limits below A line with PI <4

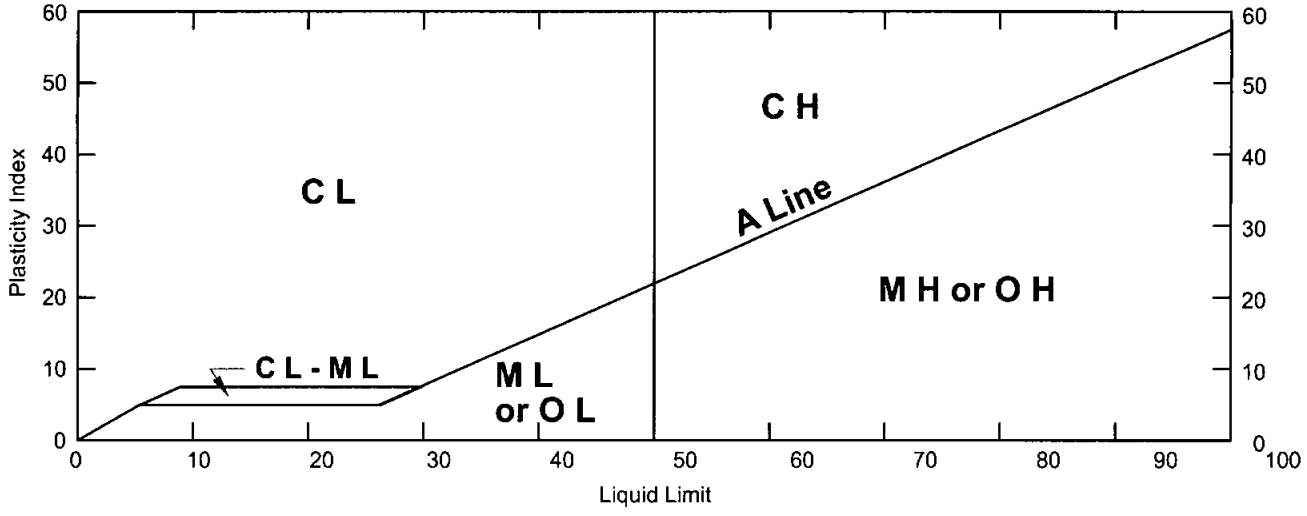
G C and S C Atterberg limits above A Line with PI >7

* Coarse-grained soils with percentage of fines between 5 and 12 are considered borderline cases required use of dual symbols.

D_{10}, D_{30}, and D_{60} are the particles diameter of which 10, 30, and 60 percent, respectively, of the soil weight are finer.

Fine-Grained Soils

M L	C L	O L	M H	C H	O H	Pt
SILT	CLAY	Organic	SILT	CLAY	Organic	Highly Organic Soils
Soils with Liquid Limit <50%			Soils with Liquid Limit >50%			
Fine-Grained Soils >50% smaller than No. 200 sieve						

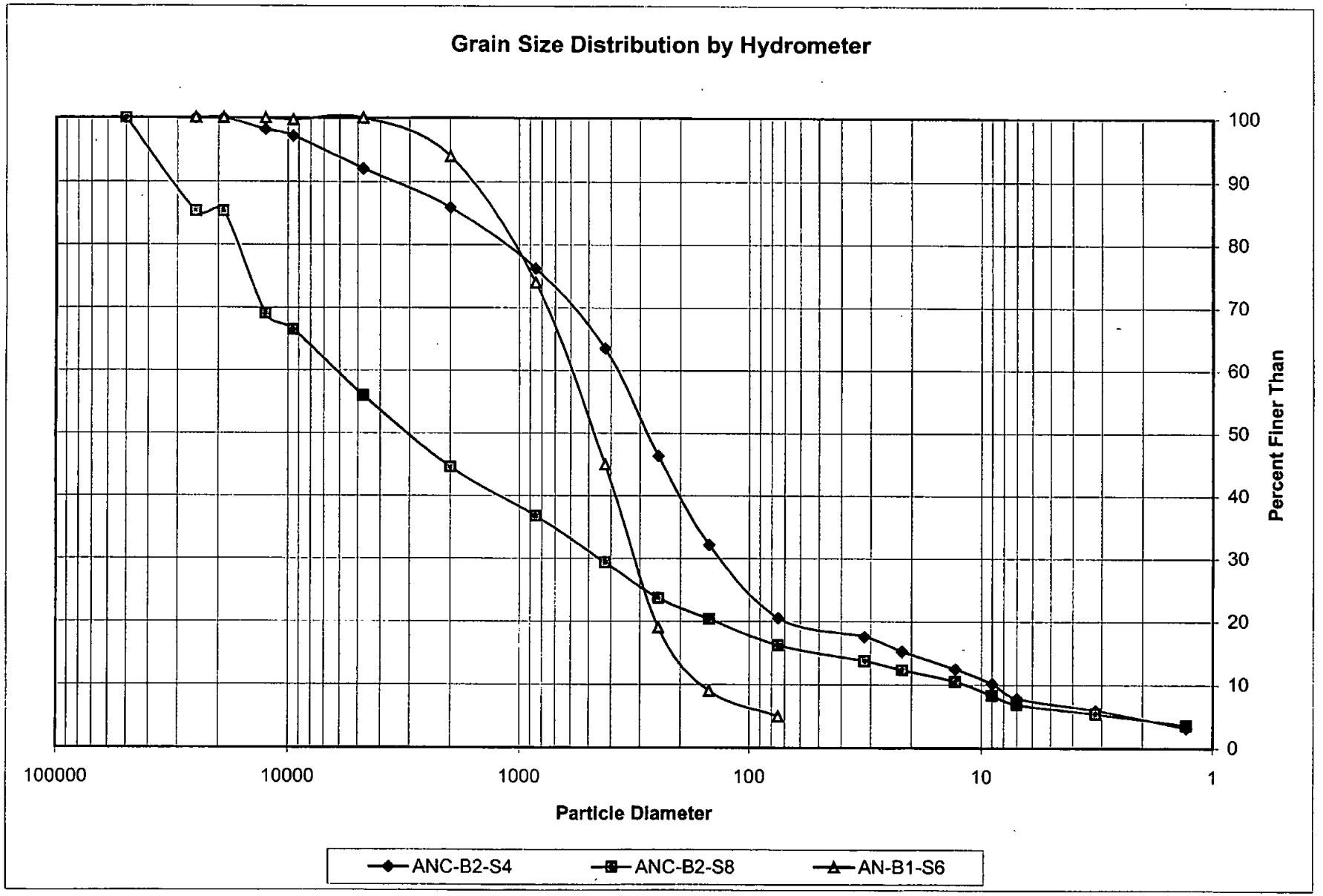


11/12/03 CVD K:\Jobs\990062-Holly Street\990062041FIG B-1-GRAIN SIZE.cdr

ANCHOR ENVIRONMENTAL, L.L.C.

Figure B-1
Unified Soil Classification (USC) System
Soil Grain Size
Holly Street Landfill Redevelopment

ANALYTICAL RESOURCES INCORPORATED



SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GROUP SYMBOL	GROUP NAME
COARSE GRAINED SOILS More Than 50% Retained on No. 200 Sieve	GRAVEL More Than 50% of Coarse Fraction Retained on No. 4 Sieve	CLEAN GRAVEL	GW	WELL-GRADED GRAVEL, FINE TO COARSE GRAVEL
			GP	POORLY-GRADED GRAVEL
		GRAVEL WITH FINES	GM	SILTY GRAVEL
			GC	CLAYEY GRAVEL
	SAND More Than 50% of Coarse Fraction Passes No. 4 Sieve	CLEAN SAND	SW	WELL-GRADED SAND, FINE TO COARSE SAND
			SP	POORLY-GRADED SAND
		SAND WITH FINES	SM	SILTY SAND
			SC	CLAYEY SAND
FINE GRAINED SOILS More Than 50% Passes No. 200 Sieve	SILT AND CLAY Liquid Limit Less Than 50	INORGANIC	ML	SILT
			CL	CLAY
		ORGANIC	OL	ORGANIC SILT, ORGANIC CLAY
	SILT AND CLAY Liquid Limit 50 or More	INORGANIC	MH	SILT OF HIGH PLASTICITY, ELASTIC SILT
			CH	CLAY OF HIGH PLASTICITY, FAT CLAY
		ORGANIC	OH	ORGANIC CLAY, ORGANIC SILT
HIGHLY ORGANIC SOILS			PT	PEAT

NOTES:

1. Field classification is based on visual examination of soil in general accordance with ASTM D2488-93.
2. Soil classification using laboratory tests is in general accordance with ASTM D2487-98.
3. Descriptions of soil density or consistency are based on interpretation of blow count data, visual appearance of soils, and/or test data.

SOIL MOISTURE MODIFIERS:

Dry - Absence of moisture, dusty, dry to the touch

Moist - Damp, but no visible water

Wet - Visible free water or saturated, usually soil is obtained from below water table

Geo Engineers

SOIL CLASSIFICATION SYSTEM

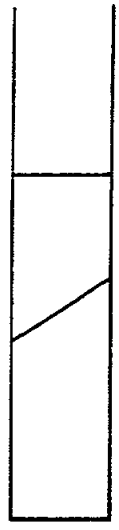
FIGURE 3

f:\soils-1.doc

LABORATORY TESTS

AL	Atterberg Limits
CP	Compaction
CS	Consolidation
DS	Direct shear
GS	Grain size
%F	Percent fines
HA	Hydrometer Analysis
SK	Permeability
SM	Moisture Content
MD	Moisture and density
SP	Swelling pressure
TX	Triaxial compression
UC	Unconfined compression
CA	Chemical analysis

SOIL GRAPH:



SM Soil Group Symbol (See Note 2)

Distinct Contact Between Soil Strata

Gradual or Approximate Location of Change Between Soil Strata.

Water Level

Bottom of Boring

BLOW COUNT/SAMPLE DATA:

Blows required to drive a 2.4-inch I.D. split-barrel sampler 12 inches or other indicated distances using a 300-pound hammer falling 30 inches.

22 Location of relatively undisturbed sample

12 Location of disturbed sample

17 Location of sampling attempt with no recovery

Blows required to drive a 1.5-inch I.D. (SPT) split-barrel sampler 12 inches or other indicated distances using a 140-pound hammer falling 30 inches.

10 Location of sample obtained in general accordance with Standard Penetration Test (ASTM D-1586) procedures

26 Location of SPT sampling attempt with no recovery

Location of grab sample

"P" indicates sampler pushed with weight of hammer or against weight of drill rig.

NOTES:

1. The reader must refer to the discussion in the report text, the Key to Boring Log Symbols and the exploration logs for a proper understanding of subsurface conditions.
2. Soil classification system is summarized in Figure 3.

Geo Engineers

KEY TO BORING LOG SYMBOLS

FIGURE 4

Date(s) Drilled	3/24/03	Logged By	EMG	Checked By	EMG
Drilling Contractor	Subterranean, Inc.	Drilling Method	D&M	Sampling Methods	Mud Rotary
Auger Data		Hammer Data	300 (lb) hammer/ (in) drop Tri-Cone Bit	Drilling Equipment	B-61 Truck Mounted Drill Rig
Total Depth (ft)	89	Surface Elevation (ft)		Groundwater Level (ft. bgs)	
Datum/ System					

Depth feet	SAMPLES Interval	Number	Recovered (in)	Blows/foot	Water Level	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, lbs/ft³	OTHER TESTS AND NOTES
0							AC	4 inches asphalt			
							CC	Concrete			
							ML	Brown sandy silt with occasional gravel (soft, moist) (fill)			
		1	13	5					18	110	Su = 800psf (torvane)
5							SP	Tan and gray fine to medium sand with occasional gravel (fill)			
		2	12	8					11	103	
		3	16	10					15	110	
							GM	Gray silty fine gravel with sand and occasional sea shells (medium dense, wet) (fill)			
10		4	12	15	▼		SP-SM	Orangish brown fine to medium sand with occasional gravel (medium dense, wet)	10	113	
							GM	Fine to coarse gravel with silt and sand (loose, wet)			
		5	10	13					9	109	
							SP-SM	Light brown fine to medium sand with silt and occasional gravel (medium dense, moist)			
15											
		6	12	14					15		%F=5,GS
20							GM	Gray fine to coarse gravel with sand (loose, wet)			
		7	6	20					15		
25											
							CL	Gray clay with occasional sand (soft, moist)			
		8	16	4					31	92	Su = 500psf (torvane)
30											

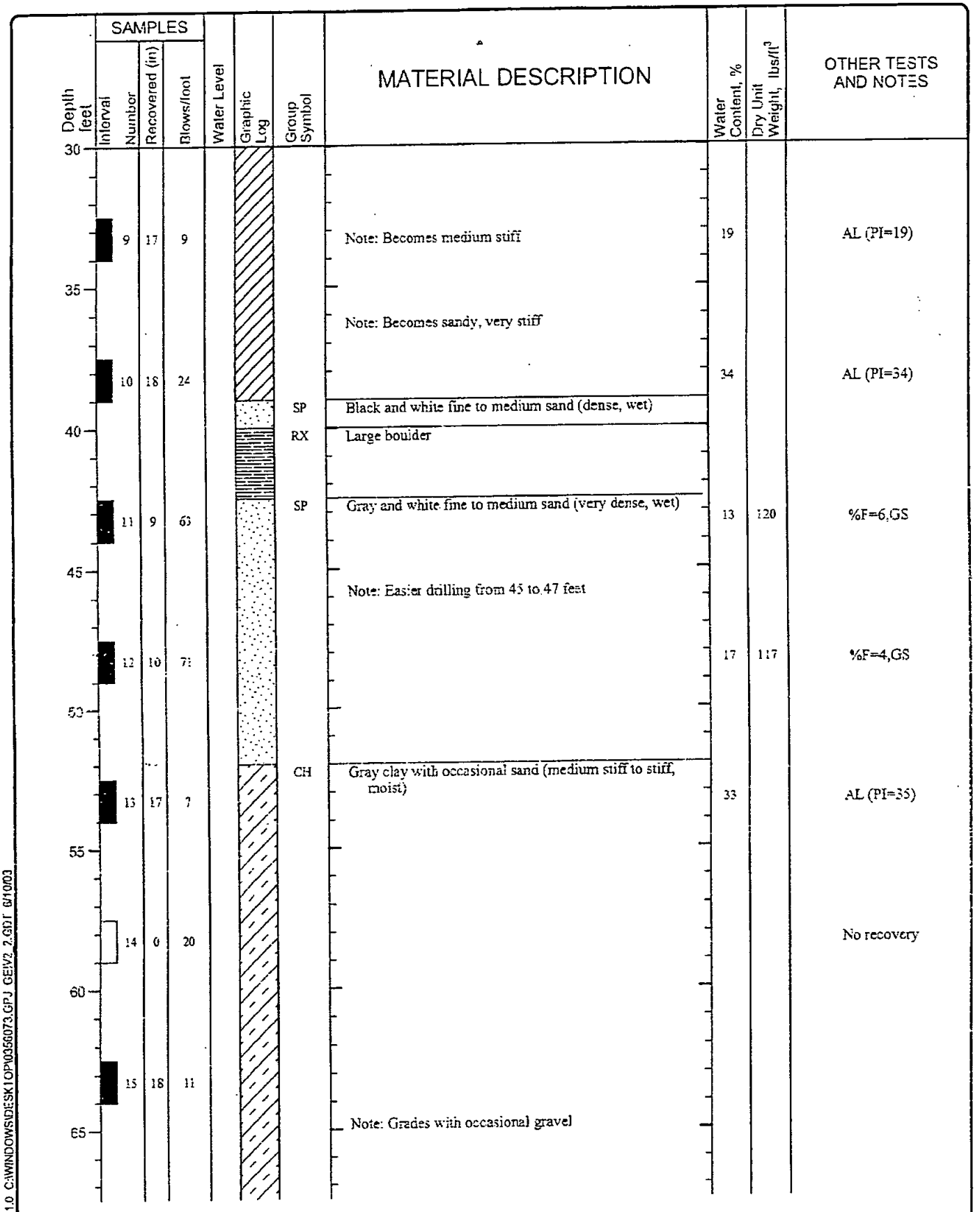
Note: See Figure 2 for explanation of symbols

LOG OF BORING B-1

Geo Engineers

Project: City of Bellingham-Holly Street Bridge
Project Location: Bellingham, Washington
Project Number: 0356-073-00

Figure: 5
Sheet 1 of 3

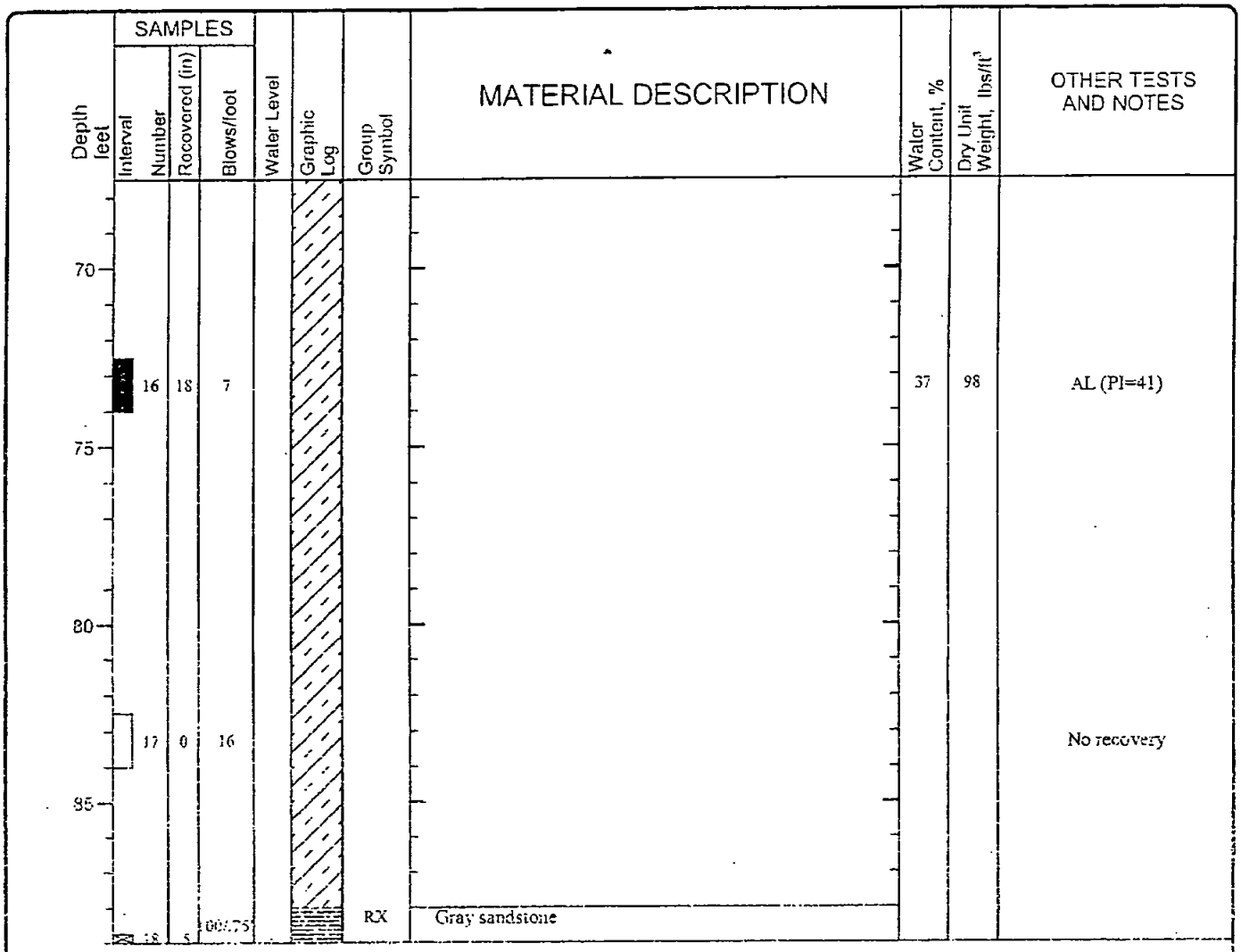


LOG OF BORING B-1 (continued)

Geo Engineers

Project: City of Bellingham-Holly Street Bridge
Project Location: Bellingham, Washington
Project Number: 0356-073-00

Figure: 5
Sheet 2 of 3



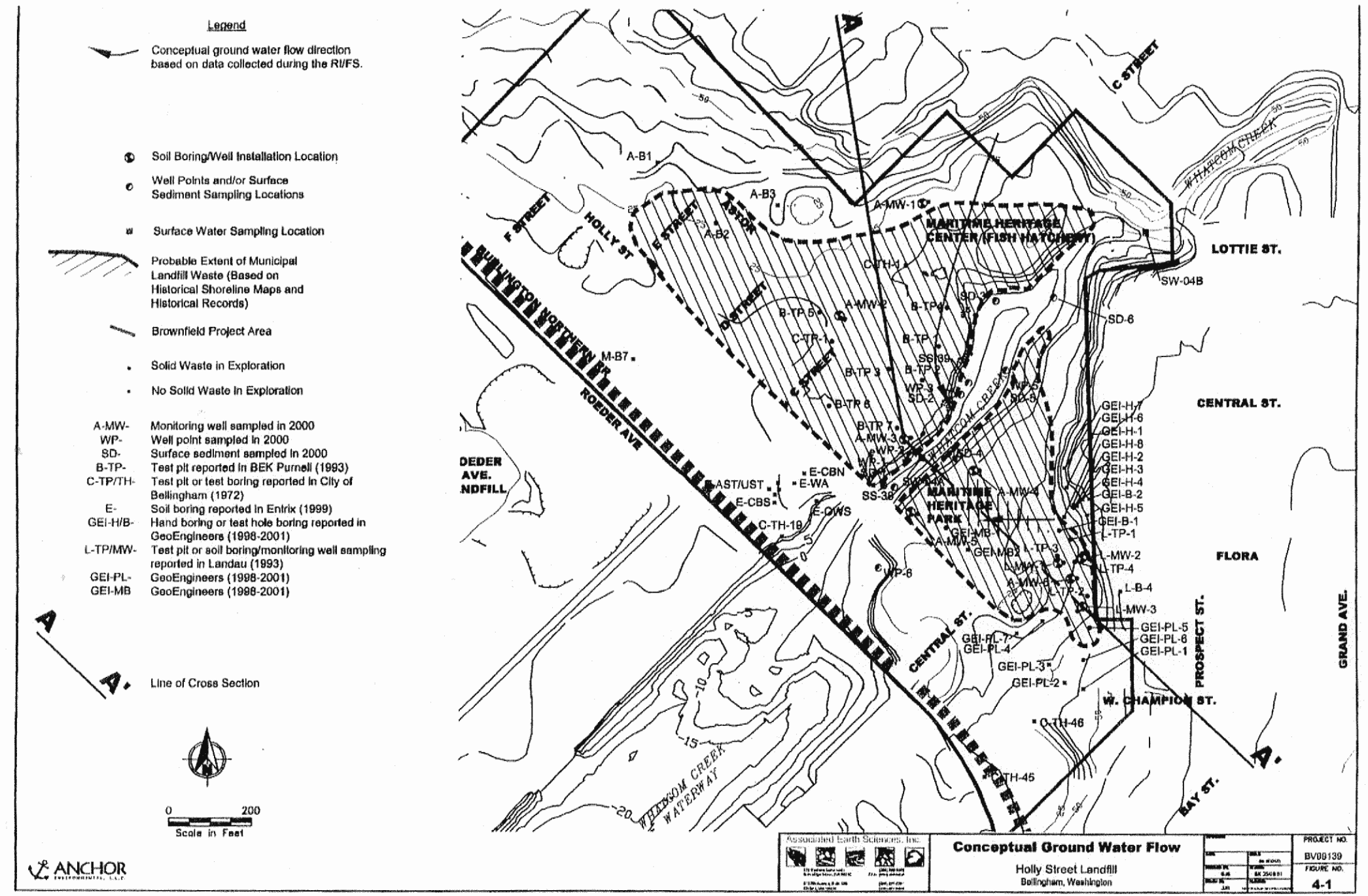
Boring completed at 89 feet on 3/24/03
Groundwater encountered at 10 feet during drilling

LOG OF BORING B-1 (continued)

Geo Engineers

Project: City of Bellingham-Holly Street Bridge
Project Location: Bellingham, Washington
Project Number: 0356-073-00

Figure: 5
Sheet 3 of 3

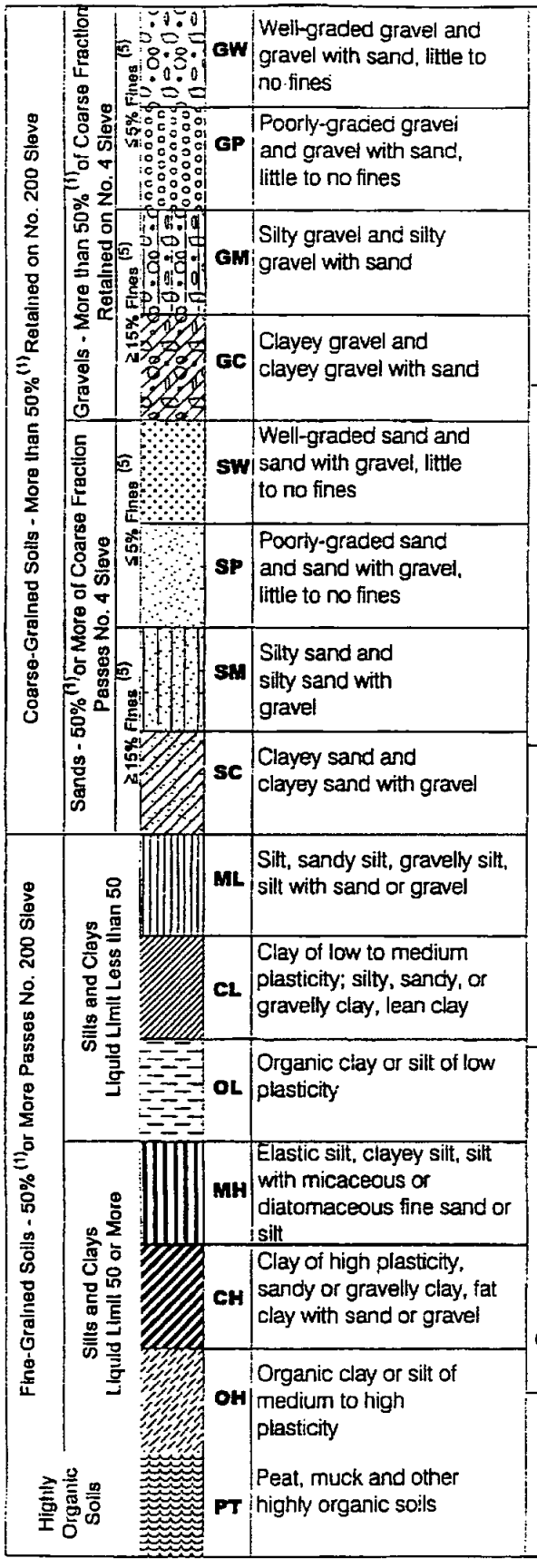


Associated Earth Sciences, Inc.

Conceptual Ground Water Flow

Holly Street Landfill
Bellingham, Washington

PROJECT NO. BV00139
FIGURE NO. 4-1



Terms Describing Relative Density and Consistency

	Density	SPT[2] blows/foot
Coarse-Grained Soils	Very Loose	0 to 4
	Loose	4 to 10
	Medium Dense	10 to 30
	Dense	30 to 50
	Very Dense	>50
	Consistency	**SPT[2] blows/foot**
Fine-Grained Soils	Very Soft	0 to 2
	Soft	2 to 4
	Medium Stiff	4 to 8
	Stiff	8 to 15
	Very Stiff	15 to 30
	Hard	>30

Test Symbols

G = Grain Size
M = Moisture Content
A = Atterberg Limits
C = Chemical
DD = Dry Density
K = Permeability

Component Definitions

Descriptive Term	Size Range and Sieve Number
Boulders	Larger than 12"
Cobbles	3" to 12"
Gravel	3" to No. 4 (4.75 mm)
Coarse Gravel	3" to 3/4"
Fine Gravel	3/4" to No. 4 (4.75 mm)
Sand	No. 4 (4.75 mm) to No. 200 (0.075 mm)
Coarse Sand	No. 4 (4.75 mm) to No. 10 (2.00 mm)
Medium Sand	No. 10 (2.00 mm) to No. 40 (0.425 mm)
Fine Sand	No. 40 (0.425 mm) to No. 200 (0.075 mm)
Silt and Clay	Smaller than No. 200 (0.075 mm)

[3] Estimated Percentage

Component	Percentage by Weight
Trace	<5
Few	5 to 10
Little	15 to 25
With	- Non-primary coarse constituents: ≥ 15% - Fines content between 5% and 15%

Moisture Content

Dry - Absence of moisture, dusty, dry to the touch

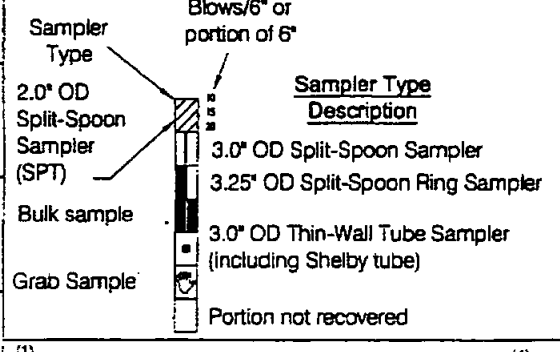
Slightly Moist - Perceptible moisture

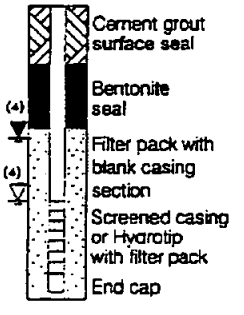
Moist - Damp but no visible water

Very Moist - Water visible but not free draining

Wet - Visible free water, usually from below water table

Symbols





[1] Percentage by dry weight
[2] (SPT) Standard Penetration Test (ASTM D-1586)
[3] In General Accordance with Standard Practice for Description and Identification of Soils (ASTM D-2488)
[4] Depth of groundwater
▼ ATD = At time of drilling
▽ Static water level (date)
[5] Combined USCS symbols used for fines between 5% and 15%

Classifications of soils in this report are based on visual field and/or laboratory observations, which include density/consistency, moisture condition, grain size, and plasticity estimates and should not be construed to imply field or laboratory testing unless presented herein. Visual-manual and/or laboratory classification methods of ASTM D-2487 and D-2488 were used as an identification guide for the Unified Soil Classification System.

log_key.dwg 03/28/00 1:1

ASSOCIATED EARTH SCIENCES, INC

Exploration Log Key

FIGURE
A-1

ASSOCIATED EARTH SCIENCES, INC

Geologic & Monitoring Well Construction Log

Project Number	Well Number	Sheet
BV99139	A-MW-1	1 of 1

Project Name	Holly Street Landfill	Surface Elevation	21.51
Location	Bellingham, Washington	Water Depth (ft bgs)	6.4
Drilling Method	Hollow Stem Auger 8" OD/ 4.5"ID	Start Date	April 17, 2000
Sampling Method	2" diameter, Split Spoon Sampler	Finish Date	April 17, 2000

Depth feet	Well Construction	Methane %	ST	Blows/ 6"	Sample ID	Mtl. Graphic	Description
	Flush monument (+0.15' stickup)						Asphalt
	Concrete seal						**FILL**
							Moist, brown SILT with GRAVEL including steel and glass debris
	Bentonite chips	0		2 3 3	S-1		Stiff, moist, brown and tan mottled SILT; trace sand, trace gravel, trace wood and glass
5	Filter Pack, 20x40 Colorado silica sand						
	6.4' (10/8/00)						**MUDFLAT DEPOSITS**
	7.5' (4/17/00)	0.2		1 1 4	S-2		Soft to medium stiff, wet, gray SILT over SILTY SAND; trace gravel, trace wood; sand fine to medium
	Well Screen 2" ID SCH 40 PVC, 0.01" slot size						
10							-cobble
	Threaded end cap, 2" ID SCH 40 PVC	0		2 4 4	S-3		**GLACIAL MARINE DRIFT**
	Bentonite chips						Stiff, wet, gray CLAYEY SILT
15				2 4 5	S-4		
							Bottom of boring at 16.5 feet.

Sampler Type (ST):
- B — Bag Sample
- O — No Recovery
- 2" OD Split-Spoon Sampler

Lab Tests:
- G - Grain Size
- P - Permeability
- M - Moisture Content

▼ Water Level (ATD) ▽ Static Water Level

Logged by: RRH
Approved by: TJF

Figure No. A - 2

ASSOCIATED EARTH SCIENCES, INC

Geologic & Monitoring Well Construction Log

Project Number	Well Number	Sheet
BV99139	A-MW-2	1 of 1

Project Name	Holly Street Landfill	Surface Elevation	19.57
Location	Bellingham, Washington	Water Depth (ft bgs)	8.7
Drilling Method	Hollow Stem Auger 8" OD/ 4.5"ID	Start Date	April 18, 2000
Sampling Method	2" diameter, Split Spoon Sampler	Finish Date	April 18, 2000

Depth feet	Well Construction	Methane %	ST	Blows/ 6"	Sample ID	Mtl. Graphic	Description
	Flush monument (~0.02' stickup)						Asphalt
	Concrete seal						FILL
							Dark brown SILTY SAND with GRAVEL
							LANDFILL DEBRIS
	Bentonite chips	0.2		5 6 14	S-1		Medium dense, moist to wet, brown SANDY GRAVEL with glass, rusted metal, and ash-like material
	Filter Pack, 20x40 Colorado silica sand						-cobble or large piece of debris
5		0.4		14 15 7	S-2		
	6.5' (4/18/00)						
	Well Screen 2" ID SCH 40 PVC, 0.01" slot size	0.4		1 0.5 0.5	S-3		-grades loose, wet and gray
	8.7' (10/8/00)						
10		0.4		1 1 1	S-4		-grades black; debris includes glass and metal
	Threaded end cap, 2" ID SCH 40 PVC						
		0.2		4 5 7	S-5		MUDFLAT DEPOSITS
							Medium dense, wet, dark gray to brown SILTY SAND with SILT interbeds; sand predominantly fine
15							Bottom of boring at 14 feet.

Sampler Type (ST):
- B Bag Sample
- No Recovery
- 2" OD Split-Spoon Sampler

Lab Tests:
- G - Grain Size
- P - Permeability
- M - Moisture Content

▼ Water Level (ATD) ▽ Static Water Level

Logged by: RRH
Approved by: TJF

Figure No. A - 3

SPARKMW HOLLY.GPJ November 7, 2000

ASSOCIATED EARTH SCIENCES, INC

Geologic & Monitoring Well Construction Log

Project Number	Well Number	Sheet
BV99139	A-MW-3	1 of 2

Project Name	Holly Street Landfill	Surface Elevation	15.29
Location	Bellingham, Washington	Water Depth (ft bgs)	8.5
Drilling Method	Hollow Stem Auger 8" OD/ 4.5"ID	Start Date	April 18, 2000
Sampling Method	2" diameter, Split Spoon Sampler	Finish Date	April 18, 2000

Depth feet	Well Construction	Methane %	ST	Blows/ 6"	Sample ID	Mtl. Graphic	Description
	Flush monument (-0.25' stickup)						Asphalt
	Concrete seal						FILL
							Medium dense, moist, brown SILTY SAND with GRAVEL
							LANDFILL DEBRIS
	Bentonite chips	0		4 5 1	S-1		Loose, moist, dark brown SILT with SAND; with ash-like material, brick, and wood
5	Filter Pack, 20x40 Colorado silica sand	0.4		1 1 2	S-2		Loose, moist to wet, dark brown to brown SILTY SAND with GRAVEL; trace glass, wood and ash-like material
	6.0' (4/18/00)						
		0.4		1 1 1	S-3		
	8.5' (10/8/00 - 72 hour mean)						
							MUDFLAT DEPOSITS
10	Well Screen 2" ID SCH 40 PVC, 0.01" slot size	0.3		2 7 12	S-4		Very loose, wet, dark brown to black SILTY SAND; trace organics and shell fragments -grades medium dense, dark gray; trace wood and gravel -silt interbed
		0.1		3 3 5	S-5		Loose, wet, dark gray GRAVEL with SAND; trace silt and shell fragments
	Threaded end cap, 2" ID SCH 40 PVC						
15							
				2 2 4	S-6		Loose, wet, dark gray SILTY SAND with SILT interbeds to 2" thick; trace wood, organics and shell fragments
20							
				2 5 6	S-7		Medium dense, wet, gray SAND; few silt; silt interbeds; trace organics; sand predominantly fine to medium

Sampler Type (ST):
- B — Bag Sample
- O — No Recovery
- 2" OD Split-Spoon Sampler

Lab Tests:
- G - Grain Size
- P - Permeability
- M - Moisture Content

▼ Water Level (ATD) ▽ Static Water Level

Logged by: RRH
Approved by: TJF
Figure No. A - 4

SPARKMW HOLLY GPJ November 7, 2000

ASSOCIATED EARTH SCIENCES, INC

Geologic & Monitoring Well Construction Log

Project Number	Well Number	Sheet
BV99139	A-MW-3	2 of 2

Project Name	Holly Street Landfill	Surface Elevation	15.29
Location	Bellingham, Washington	Water Depth (ft bgs)	8.5
Drilling Method	Hollow Stem Auger 8" OD/ 4.5"ID	Start Date	April 18, 2000
Sampling Method	2" diameter, Split Spoon Sampler	Finish Date	April 18, 2000

Depth feet	Well Construction	Methane %	S T	Blows/ 6"	Sample ID	Mtl. Graphic	Description
				4 5 7	S-8		-silty sand interbeds
30							
				4 5 8	S-9		-predominantly medium sand
35							
							GLACIAL MARINE DRIFT
				3 11 9	S-10		Very stiff, wet, gray CLAYEY SILT with 2" sand interbed
40							Bottom of boring at 39.5 feet. Original boring grouted with bentonite and cement. Moved 5 ft toward the creek and drilled to 14.5' with plug in auger then installed monitoring well
45							

Sampler Type (ST):
- B Bag Sample
- No Recovery
- 2" OD Split-Spoon Sampler

Lab Tests:
- G - Grain Size
- P - Permeability
- M - Moisture Content

▼ Water Level (ATD) ▽ Static Water Level

Logged by: RRH
Approved by: TJF
Figure No. A - 4

STARKMW HOLLY.GPJ November 7, 2000

UNIFIED SOIL CLASSIFICATION CHART (USCS)

MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS — MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS — MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES) <5%	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
			GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES) >12%	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SAND AND SANDY SOILS — MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES) <5%	SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES) >12%	SM	SILTY SANDS, SAND-SILT MIXTURES
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS — MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS — LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS — LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

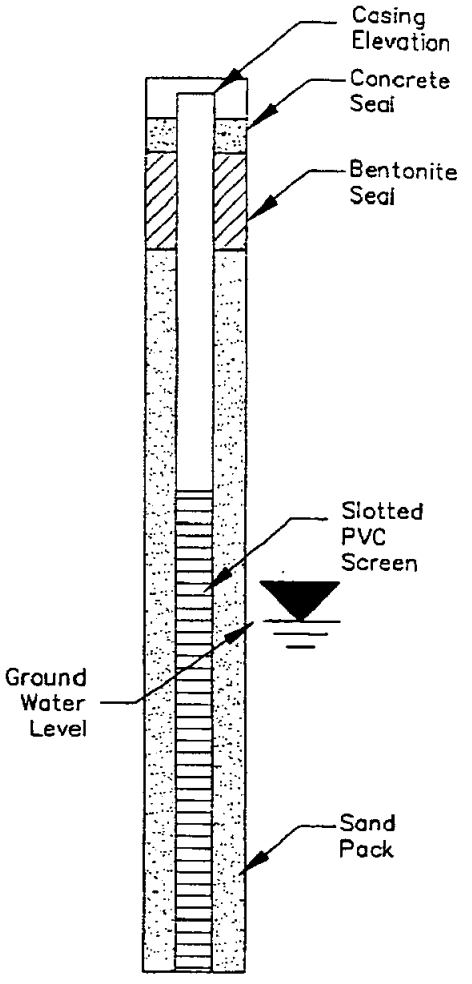
SOIL DESCRIPTIONS

Trace = 0-5%

Some = 5-12%

Gravelly, Sandy, Silty, Clayey = 12-49%

KEY TO LOG OF WELLS



KEY TO LOG OF BORINGS

- SPT No recovery
- SPT Disturbed
- SPT Undisturbed
- D&M Undisturbed
- D&M Disturbed
- D&M No recovery
- % Moisture
- D&M 300# Hammer Blows/Ft.
- SPT 140# Hammer Blows/Ft.
- Static Water Level

JOB NO.: N/A
DESIGNED BY/DRAWN BY: KRK
CHECKED BY: TEB
DWG FILE: USCS KEY TO WELLS

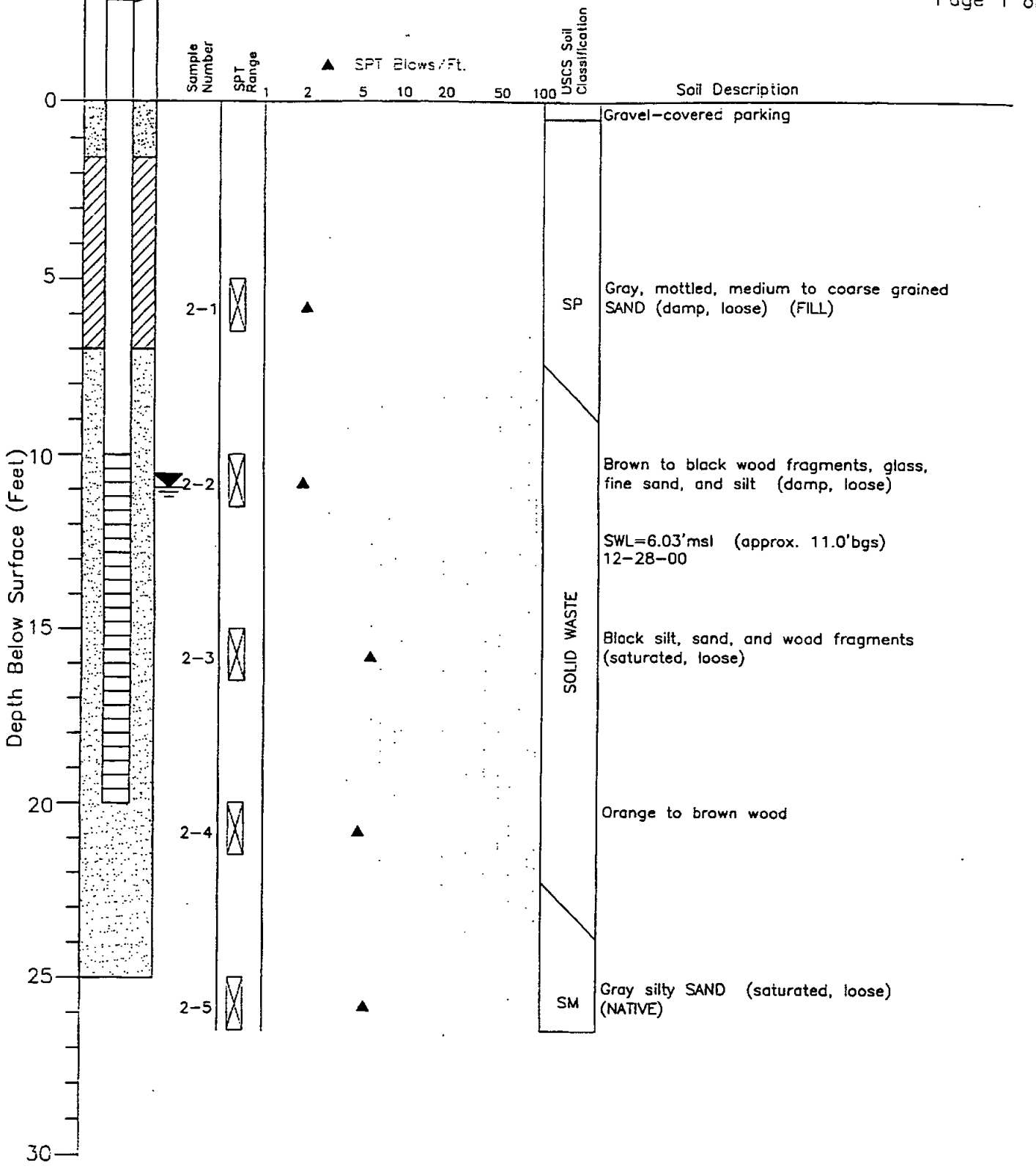
BEK ENGINEERING & ENVIRONMENTAL, INC.
CIVIL GEOTECHNICAL ENVIRONMENTAL
2138 Humboldt Street
Bellingham, WA 98225
Ph: (360) 676-9589
Ph: (800) 859-5597
Fax: (360) 676-4625

KEY TO WELL LOGS & UNIFIED SOILS CLASSIFICATION SYSTEM

DATE: N/A SCALE: H: N/A V: N/A

Well Tag # AFM 750
Casing Elevation=19.90'

Well# A-MW-4
Page 1 of 1



LOGGED BY: KRK	HAMMER SIZE: 140 lb. /30" drop AutoHammer
DRILLER: Gregory Drilling	DATE DRILLED: December 28, 2000
DRILLING METHOD: HSA	HOLE DIAMETER: 6.25-inch
SAMPLING METHOD: STP	HOLE DEPTH: 25'
CASING TYPE: PVC	WELL DIAMETER: 2"
ANNULAR PACK: 10/20 Sand	WELL DEPTH: 20'
SLOT SIZE: 10 slot	LOCATION: see drawing

See Site Plan for actual location

Soils classified visually using the Unified Soils Classification System

JOB NO.:	100195
DESIGNED BY/DRAWN BY:	KRK
CHECKED BY:	JME
DWG FILE:	WELL LOGS.DWG

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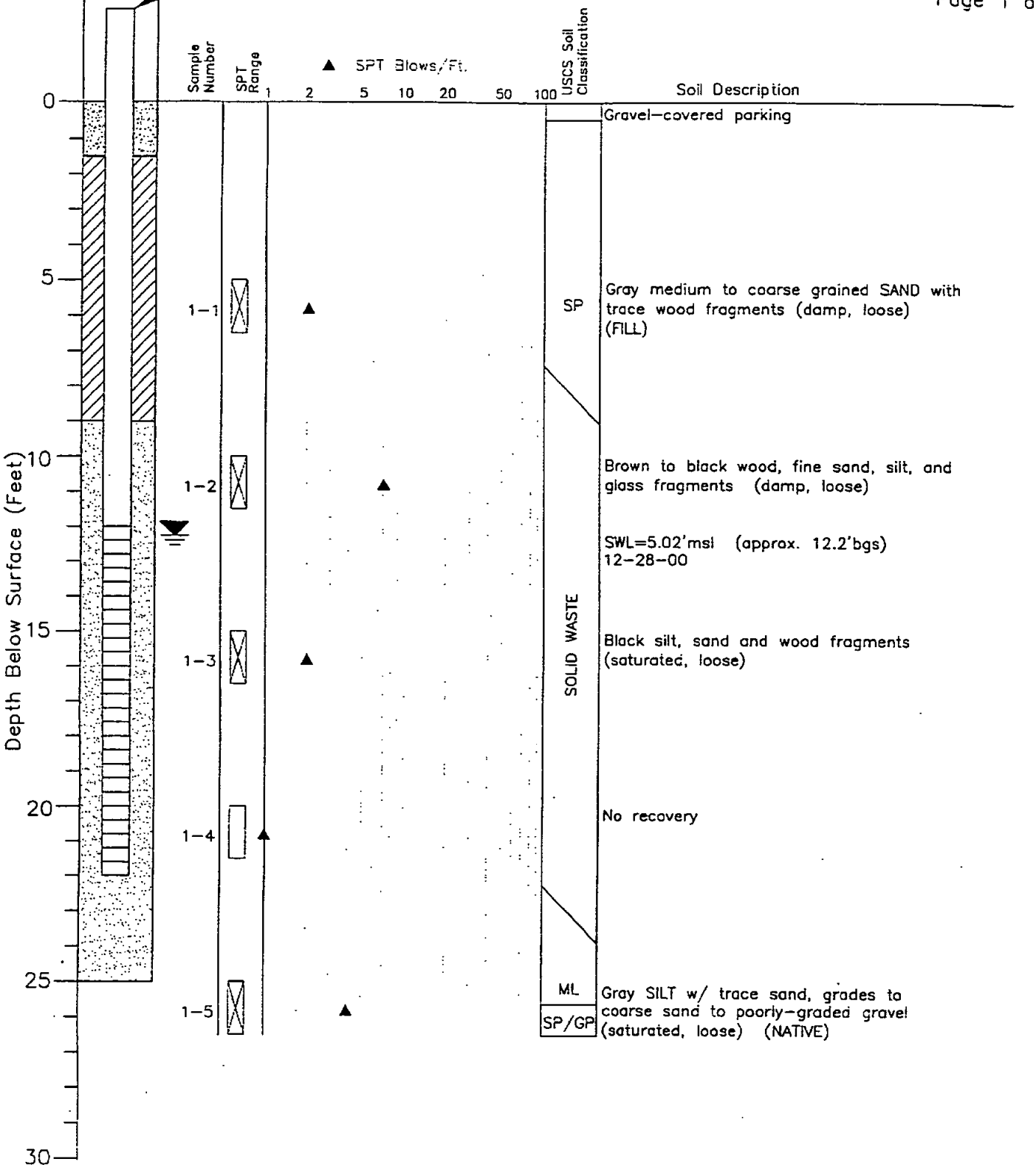
Ph: (800) 859-5597
Fax: (360) 676-4625

MONITORING WELL # A-MW-4
MARITIME HERITAGE PARK
BELLINGHAM, WASHINGTON

DATE: DECEMBER 28, 2000 SCALE: H: N/A V: N/A

Well Tag # AFM 749
Casing Elevation=20.00'

Well# A-MW-5
Page 1 of 1



LOGGED BY: JME
DRILLER: Gregory Drilling
DRILLING METHOD: HSA
SAMPLING METHOD: STP
CASING TYPE: PVC
ANNULAR PACK: 10/20 Sand
SLOT SIZE: 10 slot

HAMMER SIZE: 140 lb. /30" drop AutoHammer
DATE DRILLED: December 29, 2000
HOLE DIAMETER: 6.25-inch
HOLE DEPTH: 25'
WELL DIAMETER: 2"
WELL DEPTH: 22'
LOCATION: see drawing

See Site Plan for actual location

Soils classified visually using the Unified Soils Classification System

JOB NO.: 200195
DESIGNED BY/DRAWN BY: KRK
CHECKED BY: JME
DWG FILE: WELL LOGS.DWG

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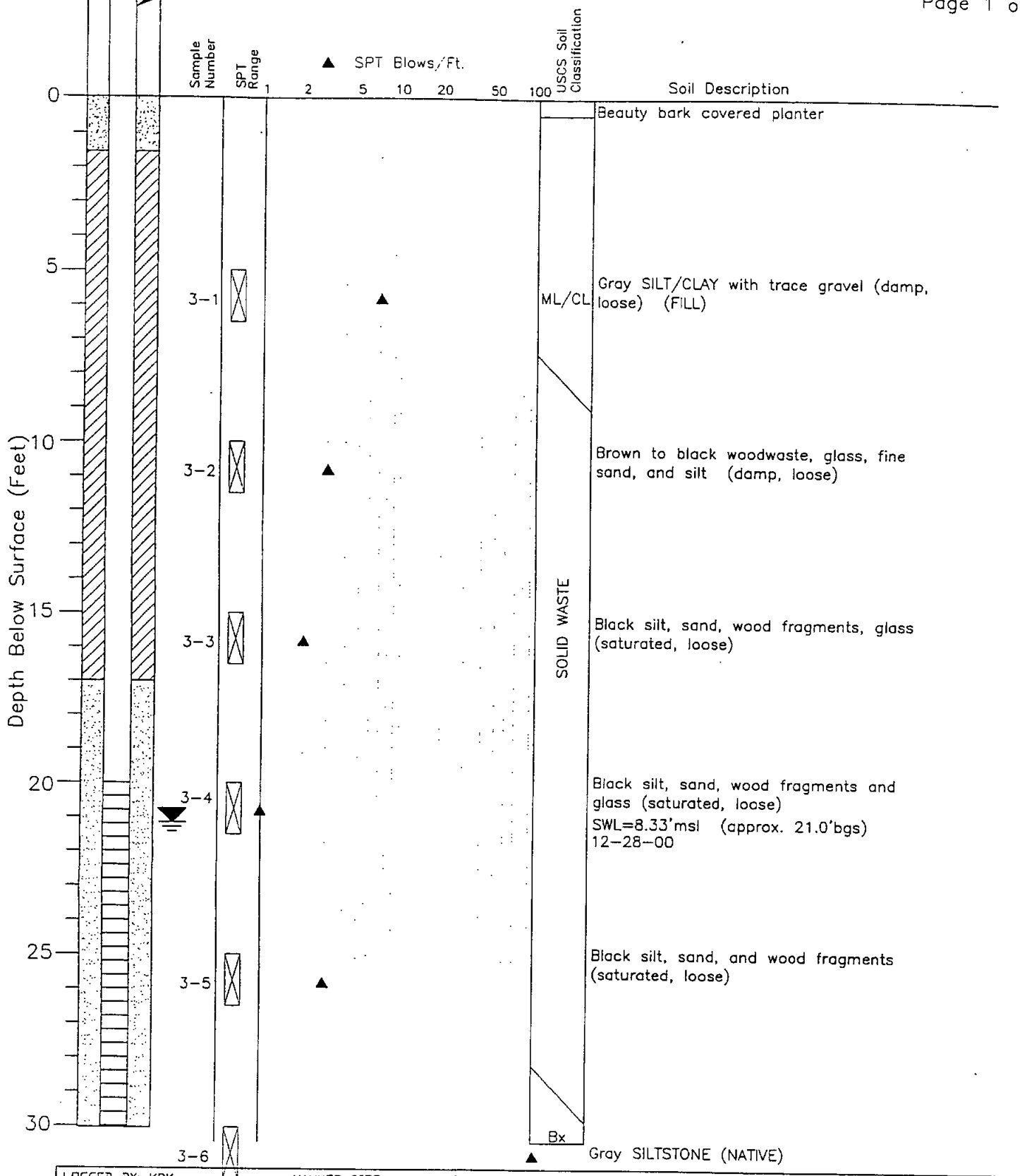
Ph: (800) 859-5597
Fax: (360) 676-4625

MONITORING WELL # A-MW-5
MARITIME HERITAGE PARK
BELLINGHAM, WASHINGTON

DATE: DECEMBER 28, 2000
SCALE: H: N/A V: N/A

Well Tag # AFM 751
Casing Elevation=32.53'

Well# A-MW-6
Page 1 of 1



LOGGED BY: KRK
DRILLER: Gregory Drilling
DRILLING METHOD: HSA
SAMPLING METHOD: STP
CASING TYPE: PVC
ANNULAR PACK: 10/20 Sand
SLOT SIZE: 10 slot

HAMMER SIZE: 140 lb. /30" drop AutoHammer
DATE DRILLED: December 28, 2000
HOLE DIAMETER: 6.25-inch
HOLE DEPTH: 30'
WELL DIAMETER: 2"
WELL DEPTH: 30'
LOCATION: see drawing

See Site Plan for actual location

Soils classified visually using the Unified Soils Classification System

JOB NO.: 200195
DESIGNED BY/DRAWN BY: KRK
CHECKED BY: JME
DWG FILE: WELL LOGS.DWG

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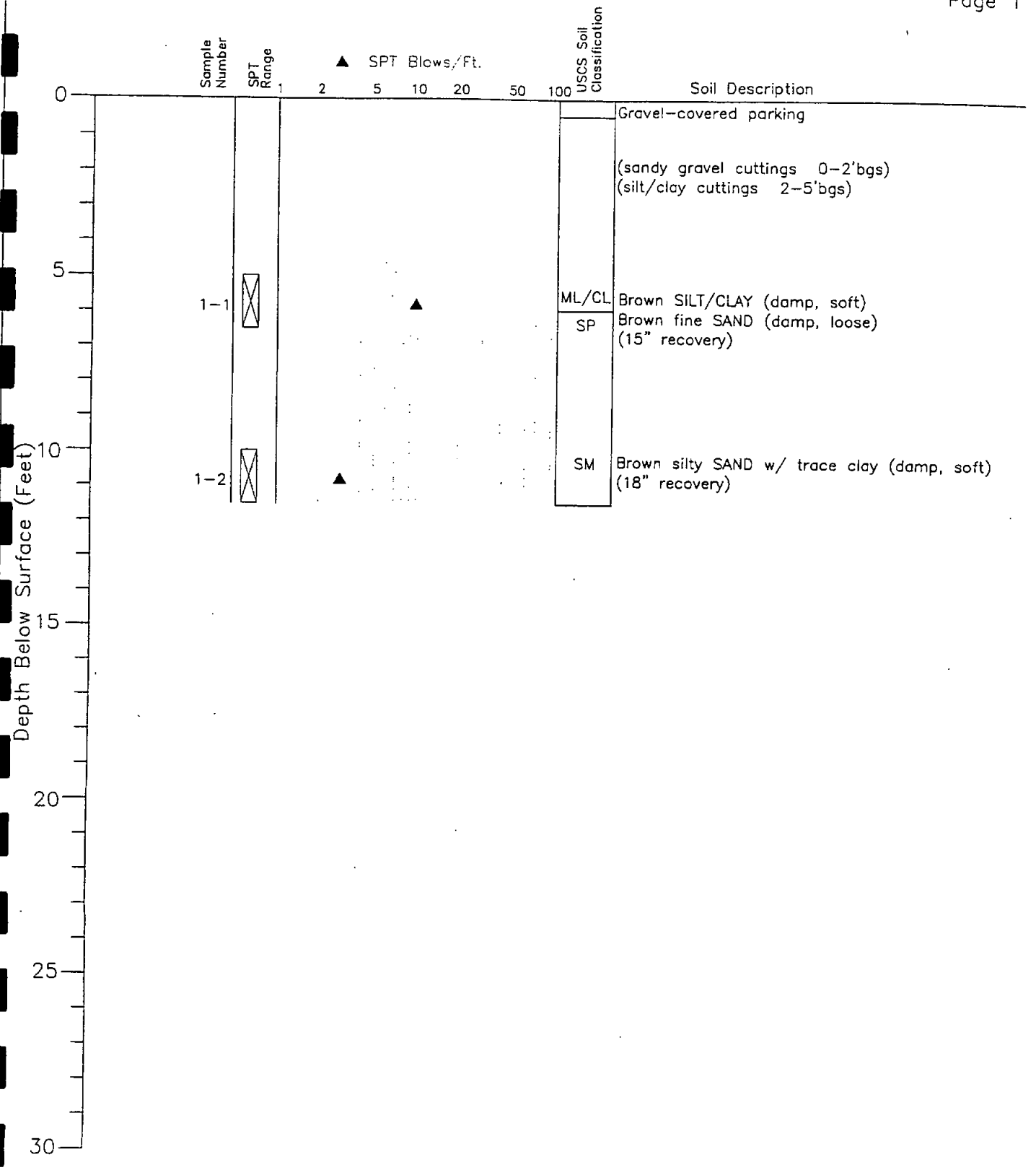
MONITORING WELL # A-MW-6
MARITIME HERITAGE PARK
BELLINGHAM, WASHINGTON

DATE: DECEMBER 28, 2000
SCALE: H: N/A V: N/A



LOGGED BY: JME
DRILLER: Gregory Drilling
DRILLING METHOD: HSA
SAMPLING METHOD: STP
CASING TYPE: n/a
ANNULAR PACK: n/a
SLOT SIZE: n/a

HAMMER SIZE: 140 lb. /30" drop AutoHammer
DATE DRILLED: December 29, 2000
HOLE DIAMETER: 6.25-inch
HOLE DEPTH: 10.0'
WELL DIAMETER: n/a
WELL DEPTH: n/a
LOCATION: see drawing

See Site Plan for actual location

Soils classified visually using the Unified Soils Classification System

JOB NO.: 200195
DESIGNED BY/DRAWN BY: KRK
CHECKED BY: JME
DWG FILE: WELL LOGS.DWG

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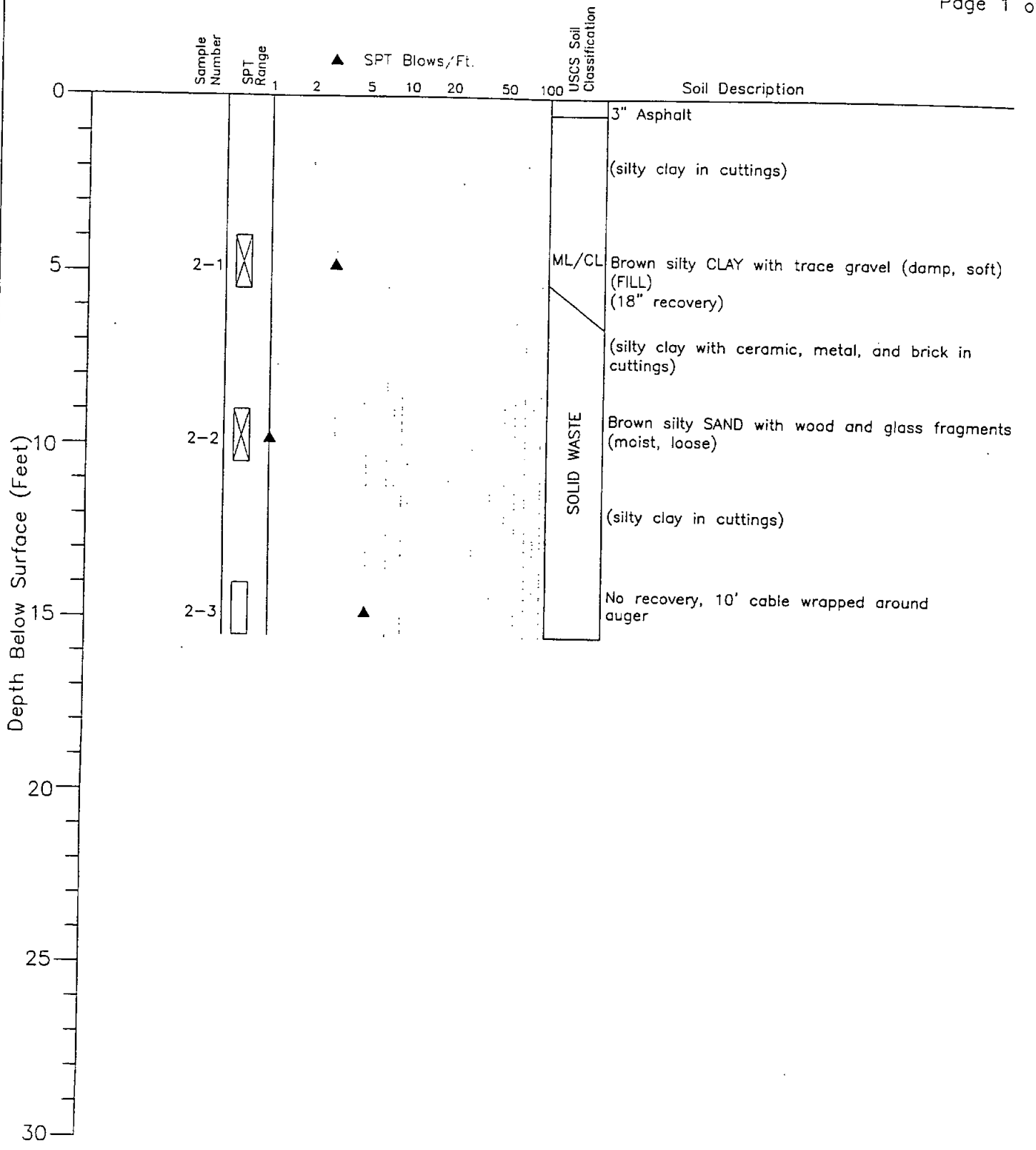
Ph: (800) 859-5597
Fax: (360) 676-4625

EXPLORATORY BORING # A-BI
MARITIME HERITAGE PARK
BELLINGHAM, WASHINGTON

DATE: DECEMBER 29, 2000
SCALE: H: N/A V: N/A



LOGGED BY: JME
DRILLER: Gregory Drilling
DRILLING METHOD: HSA
SAMPLING METHOD: STP
CASING TYPE: n/a
ANNULAR PACK: n/a
SLOT SIZE: n/a

HAMMER SIZE: 140 lb. /30" drop AutoHammer
DATE DRILLED: December 29, 2000
HOLE DIAMETER: 6.25-inch
HOLE DEPTH: 14.0'
WELL DIAMETER: n/a
WELL DEPTH: n/a
LOCATION: see drawing

See Site Plan for actual location

Soils classified visually using the Unified Soils Classification System

JOB NO.: 200195
DESIGNED BY/DRAWN BY: KRK
CHECKED BY: JME
DWG FILE: WELL LOGS.DWG

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EXPLORATORY BORING # A-B2
MARITIME HERITAGE PARK
BELLINGHAM, WASHINGTON

DATE: DECEMBER 29, 2000
SCALE: H: N/A V: N/A